In the path finding process, Distance Vector Estimation does not have to estimate tree path distance anymore. As a result, the first phase is not necessary. There will be no DVMyInfo, DVOurInfo, or DVInform frames. It follows that the DVMyInfo_Proc, DVOurInfo_Proc, and DVInform_Proc procedures may be disabled or removed by the STAR bridges. Since the next hop bridge is always a direct neighbor and all distances are accurate, need for the fields *next(n, n')*, *FG_A(n, n')*, *FG_T(n, n')*, and *FG_R(n, n')* in *DVT(n, n')* is eliminated. The Distance Vector Enhancement procedure will be exactly the same as the conventional distance vector update procedure since all the distances are accurate.

Mapping between end stations and agent bridges is still needed. It follows that there is still need for the ESL Table. Since all bridges attached to a LAN are STAR bridges, the bridge that has the smallest Bridge ID can be selected to be the agent bridge for the stations. Note that the agent bridge of each end station is defined and known by all bridges for all end stations. Therefore, when the destination end station for a data frame is known, the data frame can always travel on a STAR forwarding path. If the destination end station for a data frame is unknown, there is need to ensure that the destination end station receives no duplicate of the data frame. In this respect, the IEEE 802.1D spanning tree is useful for loop-free flooding of the data frame throughout the bridged LAN. Data frames still have to be encapsulated in order to distinguish data frames just sent out by end stations with data frames that are forwarded by another bridge.

The STAR bridges have to keep topology information by means of distance vectors even after complete migration. The size of a distance vector is proportional to the number of bridges. If the bridged LAN is large and consists of a lot of bridges, keeping distance vectors takes too much space. As a result, it is desirable to have another protocol that requires less topology information but is able to enhance tree paths.

Appendix

List of Acronyms

BA	Bridge Address
BF	Bridge Forwarding
BPDU	Bridge Protocol Data Unit
CM	Cable Modem
CMTS	Cable Modem Termination System
DF	Data Frame
DHCP	Dynamic Host Configuration Protocol
DLS	Distributed Load Sharing
DOCSIS	Data-Over-Cable Service Interface Specifications
DV	Distance Vector
DVC	Distance Vector Computation
DVCN	Distance Vector Change Notification
ESL	End Station Location
FD	Forwarding Database
GDLS	Generalized Distributed Load Sharing
ID	Identifier
IP	Internet Protocol
LAN	Local Area Network
LLC	Logical Link Control
MAC	Medium Access Control
QoS	Quality of Service
RST	Rooted Spanning Tree
SBPDU	STAR Bridge Protocol Data Unit
SLA	Station Location Announcement
STAR	Spanning Tree Alternate Routing

Notation	Definition	Remarks
V	Set of bridges representing all bridges	
B	Set of bridges representing STAR bridges	$B \subseteq V$
$N(x)$	Set of all direct neighbors of bridge x	$N(x) \subseteq V\backslash\{x\}$
$N_B(x)$	Set of direct STAR neighbors of x	$N_B(x) \subseteq N(x)$, $N_B(x) \subseteq B$
$N'_B(x)$	Set of distant STAR neighbors of x	$N'_B(x) \subseteq B$
$P(x)$	Set of all ports of bridge x	
$P_T(x)$	Set of tree ports of bridge x	$P_T(x) \subseteq P(x)$
$p_r(x)$	Root port of bridge x	
$p(x, y)$	Port of bridge x leading to neighbor bridge y	$p(x, y) \subseteq P(x)$.
$c(x, y)$	Weight of link between bridge x and bridge y	$c(x, y) = 0$ if $x = y$ $c(x, y) > 0$ if $x \neq y$
$d_r(x)$	Root path distance of bridge x for x for $x \in V\backslash\{r\}$	Root bridge r is given
$Treepath(x, y)$	Tree path from x to y	$x \in V$, $y \in V$
$d_T(x, y)$	Tree path distance between bridge x and bridge y	$d_T(x, y) = 0$ if $x = y$ $d_T(x, y) > 0$ if $x \neq y$
$d(x, y)$	Current estimated distance from x to y, for $x \in B$ and $y \in B\backslash\{x\}$	$d(x, y) = 0$ if $x = y$ $d(x, y) > 0$ if $x \neq y$
$F(x, y)$	Forwarding port from bridge x to bridge y for $x \in B$ and $y \in B\backslash\{x\}$	$F(x, y) \in P(x)$
$f(x, s)$	Forwarding port from bridge x to end station s for $x \in V$ and $s \in M$	$f(x, s) \in P(x)$
M	Set of all end stations	
$Ab(s)$	Agent bridge of end station s	$s \in M$, $ab(s) \in B$
$Db(s)$	Designated bridge of end station s	$db(s) \in V$
$S(x)$	Set of end stations in the FD of x, $x \in V$	$S(x) \subseteq M$
$H(x)$	Set of end stations in ESL Table of x, $x \in B$	$H(x) \subseteq M$
$Nca(x, y)$	Nearest common ancestor of bridge x and bridge y	$nca(x, y) \in V$
$Path(x, y)$	The forwarding path, from x to y, used by the proposed protocol	$x \in V$, $y \in V$
$len(x, y)$	Length of $path(x, y)$	$len(x, y) = 0$ if $x = y$ $len(x, y) > 0$ if $x \neq y$
$Dsan(n)$	Distant STAR ancestor neighbor of bridge $n \in B$	$dsan(n) \in B$
$Dsanc(n)$	Child of distant STAR ancestor neighbor of bridge $n \in B$	$dsanc(n) \in V$
$Dcc(n)$	Doubly counted cost between $dsan(n) \in B$ and $dsanc(n) \in V$	$dcc(n) > 0$
$cb(k, n)$	Child of bridge $k \in B$ on a tree path leading from k to $n \in B$	$cb(k, n) \in V$

Table A: Notation

While the principles of the invention have been described above in connection with specific apparatus, it is to be clearly understood that this description is made only by way of example and not as a limitation on the scope of the invention.